Overhaul - New Beetle, 09G

APPLICATION

TRANSMISSION APPLICATION

Application	Transmission Model
1.8L (2002-2004)	09G, 6-Speed
2.0L (2003-2004)	09G, 6-Speed

IDENTIFICATION

Transmission code letters are given on type plate (arrow). See **Fig. 1** . Transmission code letters are also given on vehicle data plate.

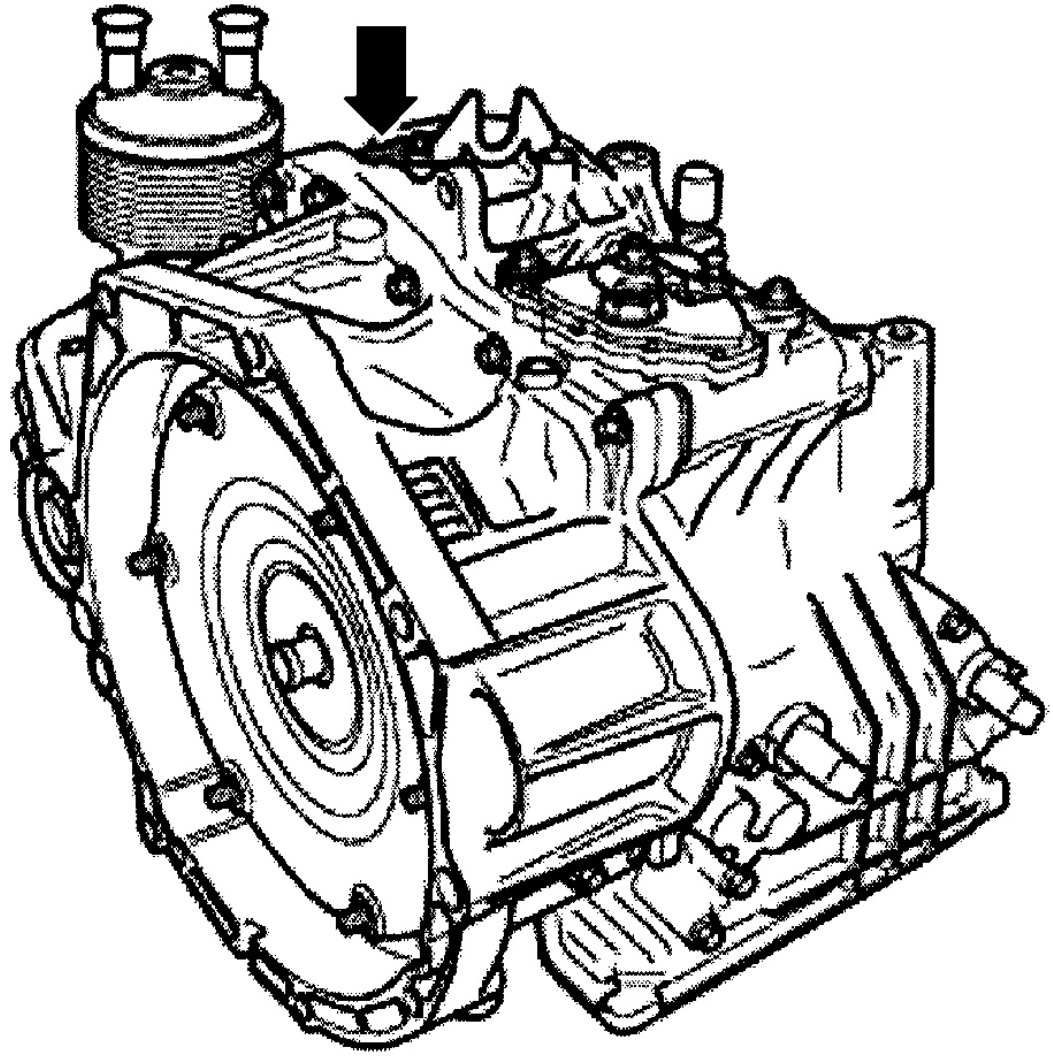

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Fig. 1: Locating Transmission Identification Code
Courtesy of VOLKSWAGEN UNITED STATES, INC.

CODE LETTERS, TRANSMISSION APPLICATION, RATIOS, EQUIPMENT

Automatic transmission			**09G**					
Transmission	Code letters		**GGZ**		**GHE**			
	Manufactured	from	09.02		05.03			
		to						
Torque converter	Code letters		**QEAA**		**QEAA**			
Number of plates			Inner	Outer	Inner	Outer	Inner	Outer
	Clutch -K1-		5	5	6	6		
	Clutch -K2-		3	3	3	3		
	Clutch -K3-		3	3	3	3		
	Brake -B1-		4	3	4	3		
	Brake -B2-		6	6	6	6		
Application	Model		New Beetle 1998		New Beetle 1998			
	Engine		2.0 l - 85 kW		1.8 l - 110 kW			

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Fig. 2: Transmission Codes GGZ & GHE (1 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Transmission	Code letters		GGZ	GHE	
Ratios	1st gear		4.044	4.044	
	2nd gear		2.371	2.371	
	3rd gear		1.556	1.556	
	4th gear		1.159	1.159	
	5th gear		0.852	0.852	
	6th gear		0.672	0.672	
	Reverse gear		3.193	3.193	
Intermediate drive	No. of teeth	Input gear	49	49	
		Output gear	52	52	
	Ratio		1.061	1.061	
Final drive	No. of teeth	Drive pinion	15	15	
		Ring gear	61	58	

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Fig. 3: Transmission Codes GGZ & GHE (2 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

DESCRIPTION & OPERATION

TRANSMISSION

The 6-speed automatic transmission 09G is equipped with 6 hydraulically activated forward gears. The 2nd, 3rd, 4th ,5th and 6th gears become mechanically driven gears by cutting out torque converter slip when the lock-up clutch is closed.

TORQUE CONVERTER

The torque converter is equipped with a lock-up clutch. The lock-up clutch is closed dependent on load and speed. The 2nd, 3rd, 4th, 5th and 6th gears are then driven mechanically independent of slip.

ATF

The ATF oil is filled-for-life. The ATF does not require changing within the framework of a service.

When checking oil level use only ATF with the Part No. G 055 025 A2.

The ATF level in the planetary gearbox and the final drive is checked and filled simultaneously. See **SERVICING - A/T (09G)** article.

GUIDED FAULT FINDING, VEHICLE SELF-DIAGNOSIS AND MEASURING TECHNOLOGY

Before performing repairs to the automatic transmission, determine the cause of the malfunction as precisely as possible with the aid of "Guided fault finding".

The guided fault finding is performed with Vehicle Diagnosis, Testing and Information System VAS 5051.

TRANSMISSION CONTROL MODULE -J217-

NOTE: Determining the driving situation and driving resistance dependent gear change point occurs automatically.

With Driving Situation Gear Changes (Fuzzy Logic)

Advantages:

- Gear changes are consumption orientated
- Maximum engine output is always available
- Individual adaptation of gear change points in all driving situations
- Gear change points are infinitely variable

Gear Change Point Variations For Hills

An additional gear change map automatically selects gear changes for hills dependent upon accelerator pedal position and driving speed.

- Gear change map for extreme uphill stretches is matched to engine output

- Gear change map for extreme downhill stretches is matched to braking effect of the engine

LUBRICATION & ADJUSTMENTS

For lubrication and adjustments, see **SERVICING - A/T (09G)** article in TRANSMISSION SERVICING.

ON-VEHICLE SERVICE

AXLE SHAFTS

For information on axle shaft, see **AXLE SHAFTS** article in DRIVELINE/AXLES.

TRANSMISSION COMPONENTS

For information on components serviceable while transmission is installed in vehicle, see **SERVICING - A/T (09G)** article.

APPLY & BRAKE CLUTCH APPLICATION

Manufacturer does not provide specific information for apply and brake clutch application.

TRANSMISSION CHECKING

VAS 5051, CONNECTING AND SELECTING FUNCTION

Special Tools And Equipment

- VAS 5051 Vehicle Diagnosis, Testing and Information System
- Diagnostic cable VAS 5051/1 or VAS 5051/3

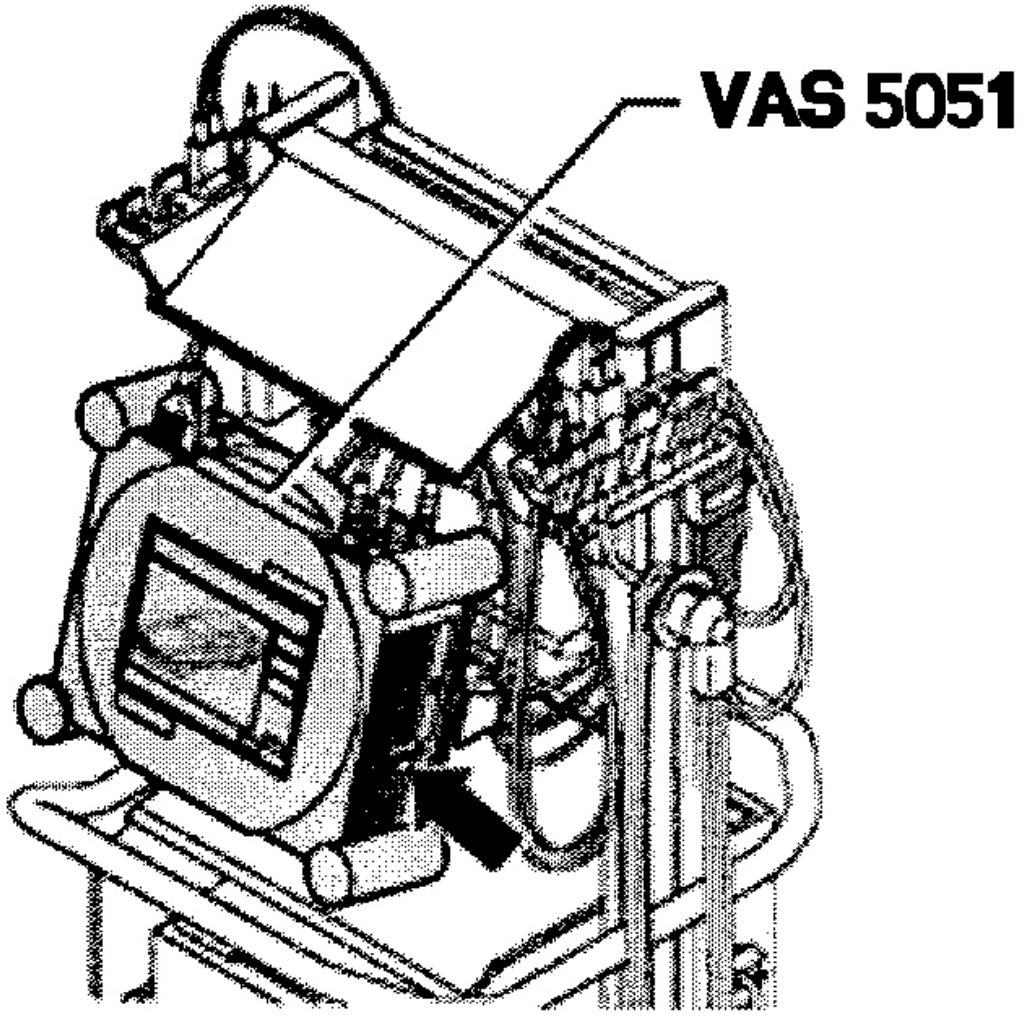

Fig. 4: Identifying Tester (VAS 5051)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

VAS 5051, Connecting And Selecting Function

WARNING:

- **When performing a road test the test and measuring units must be secured on the rear seat.**
- **During the road test only one person must operate these units.**

With ignition switched off, connect tester VAS 5051 to Data Link Connector (DLC) using diagnostic cable

VAS 5051/1 or VAS 5051/3. See **Fig. 5** .

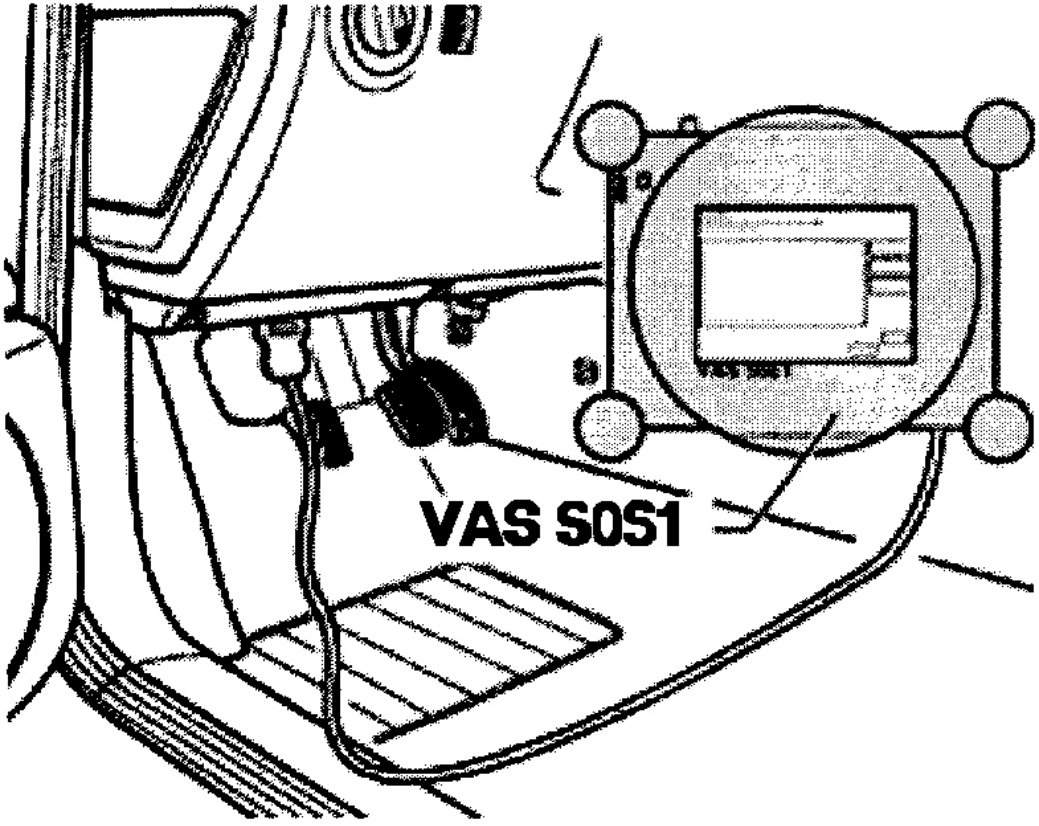

Fig. 5: Connecting Diagnostic Cable To DLC
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Switch tester on (arrow). See **Fig. 4** .

Tester is operationally ready when picture of a vehicle appears on display.

Switch ignition on.

Touch key on screen for: Guided Fault finding.

Select one after another:

- Brand
- Model

- Model year
- Variant
- Engine code

Confirm data as entered:

NOTE: Wait until the tester has read all the available control modules.

Using "Go to" key, select "Function/component selection"

Follow instructions on screen to start functions desired.

REPAIR INSTRUCTIONS

The maximum possible care and cleanliness and proper tools are essential to ensure satisfactory and successful transmission repairs. The usual basic safety precautions also apply when performing vehicle repairs.

A number of generally applicable instructions for individual repair operations, which are otherwise mentioned at various points in the repair manual; are summarized here.

BATTERY DISCONNECTING & RECONNECTING

CAUTION: Before beginning repairs on the electrical system:

- **Obtain anti-theft radio security code.**
- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**
- **Do not loosen or remove ground strap from body. Disconnect terminal from battery only.**

For work steps required after reconnecting battery, see **Fig. 6** .

Work steps	completed?
Diagnostic Trouble Code (DTC) Memory: Check using VAS 5051 Tester in mode "Guided Fault Finding".	
Power windows (where applicable): Completely open and close all power windows.	
Radio: Input anti-theft radio code and check radio, CD & tape player functions as applicable.	
Clock: Check and reset to local time.	
All electrical consumers: Check function.	

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Fig. 6: Reconnecting Battery Work Steps
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE: **If desired, print this page and use the table above as a checklist.**

TRANSMISSION

- When an automatic transmission is replaced the following fluid levels must be checked:

  ATF in planetary gearbox and final drive. See **SERVICING - A/T (09G)** article.

  Capacities and specifications. See **SERVICING - A/T (09G)** article.

- Do not run engine or tow vehicle with oil pan removed or when there is no ATF in transmission.
- Secure torque converter against falling out when transmission is removed.
- Clean joints and connecting points thoroughly before loosening.
- When installing the transmission ensure that the dowel sleeves between the engine and the transmission are seated correctly.
- Place parts that have been removed on a clean surface and cover so that they are not soiled. Use foil and paper. Do not use fluffy cloths!
- Only install clean components: Only unpack replacement parts immediately prior to installation.
- Carefully cover opened components or seal if the repair cannot be performed immediately.
- Replace transmission if any of the selector elements are scorched/burned.
- A basic (default) setting must be performed each time the transmission is reinstalled.

GASKETS, SEALS

- Always replace O-rings, seals and gaskets.
- After removing seals/gaskets etc. always check contact surfaces on housings or shafts for burrs and damage and correct before reinstalling.
- The open side of an oil seal faces toward the oil.
- Before installing an oil seal moisten the outer surfaces and the sealing lip sparingly with ATF.
- Moisten O-rings with ATF to prevent damage to the O-ring when installing.
- Only use ATF in the areas normally lubricated by ATF. Other lubricants will cause the hydraulic elements to malfunction.
- After installing, check ATF level in planetary gearbox/final drive and correct levels as necessary.

  ATF in planetary gearbox and final drive. See **SERVICING - A/T (09G)** article.

  Capacities and specifications. See **SERVICING - A/T (09G)** article.

BOLTS, NUTS

- Loosen and tighten the screws and bolts for securing the covers and housings in a diagonal sequence.
- Do not cant particularly sensitive parts, e.g. valve body, and loosen and tighten in stages using diagonal sequence.
- Prescribed torque specifications apply to unoiled nuts, screws/bolts.

- Threads of bolts/screws that are secured by locking fluid are to be cleaned with a wire brush. Then insert bolts/screws with AMV 185 100 A1.
- All threaded holes where locking fluid is employed must be cleaned with a thread tap to remove remnants of locking fluid. Otherwise there is a danger that a bolt/screw will shear when reinstalling.
- Replace self locking nuts and bolts/screws.

VALVE BODY

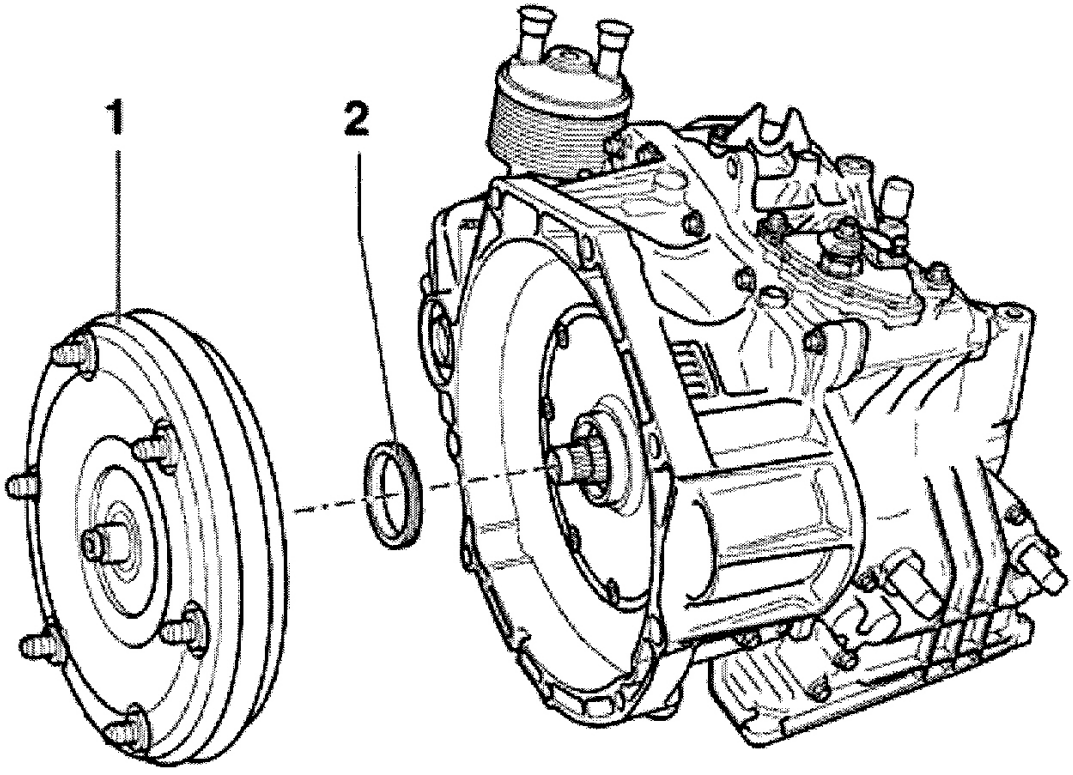
- The valve body is allocated according to transmission code. See **CODE LETTERS, TRANSMISSION APPLICATION, RATIOS, EQUIPMENT** .

GUIDED FAULT FINDING, VEHICLE SELF-DIAGNOSIS AND MEASURING TECHNOLOGY

Before servicing the automatic transmission, determine the cause of the malfunction as precisely as possible with Vehicle Diagnosis, Test and Information System VAS 5051 with the aid of "Guided fault finding", "Vehicle self-diagnosis" and "Measuring technology".

TORQUE CONVERTER

ASSEMBLY OVERVIEW



1 - Torque converter

- Secure torque converter against falling out when transmission is removed

2 - Oil seal

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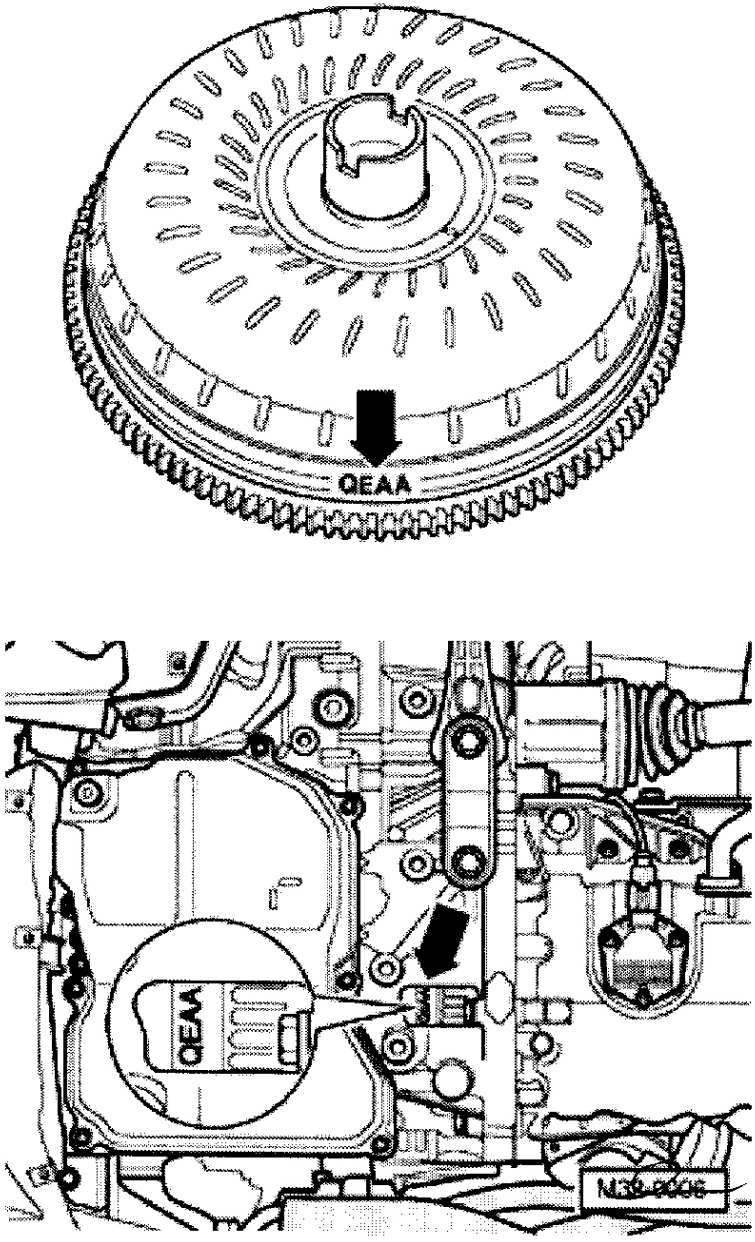
Fig. 7: Overview Of Torque Converter Assembly
Courtesy of VOLKSWAGEN UNITED STATES, INC.

TORQUE CONVERTER, IDENTIFICATION

There are various torque converters. Identification is via code letters (arrows). See **Fig. 8** .



* (Transmission installed)

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Fig. 8: Locating Torque Converter Code
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Allocating torque converter to transmission, see **CODE LETTERS, TRANSMISSION APPLICATION,**

RATIOS, EQUIPMENT .

TORQUE CONVERTER, DRAINING

Special Tools And Equipment

- V.A.G 1358/A Oil extractor unit
- V.A.G 1358 A/1 Oil extraction probe

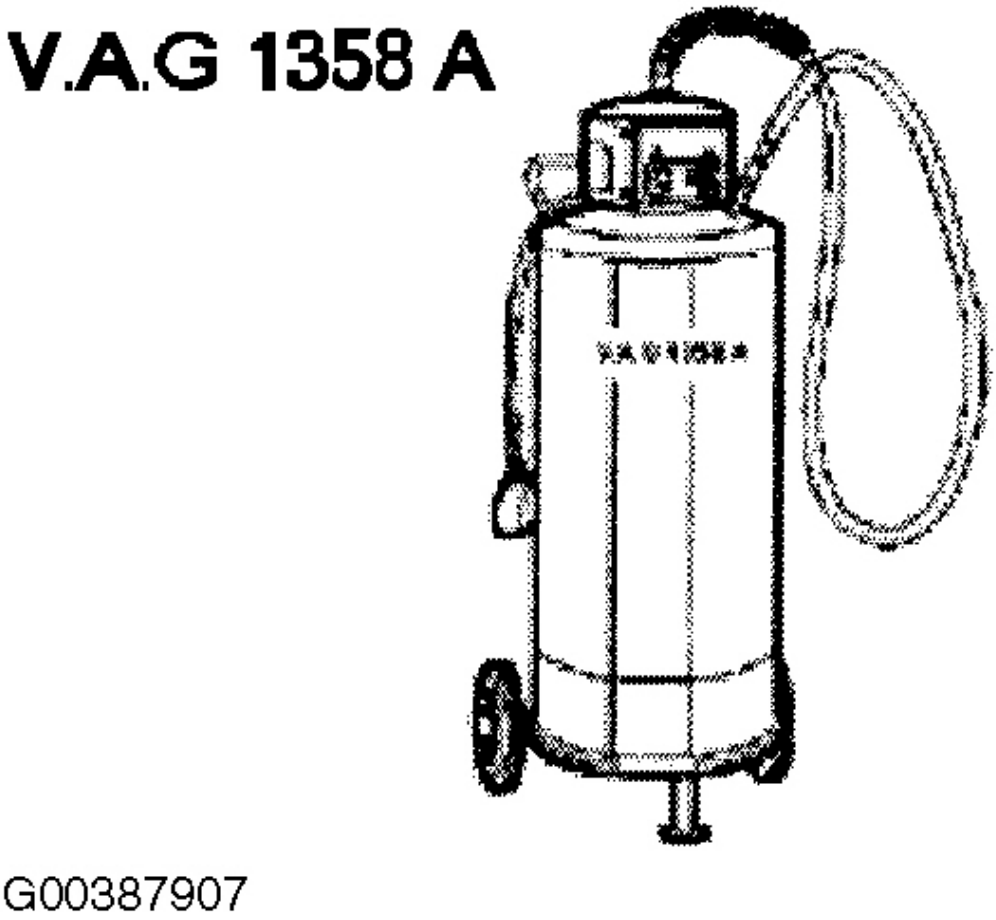

Fig. 9: Identifying Oil Extractor
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Drain the torque converter when performing a major overhaul of the transmission or if the ATF has become

contaminated by abrasion as follows:

Extract ATF from torque converter using V.A.G 1358 A and probe V.A.G 1358 A/1. See **Fig. 10** .

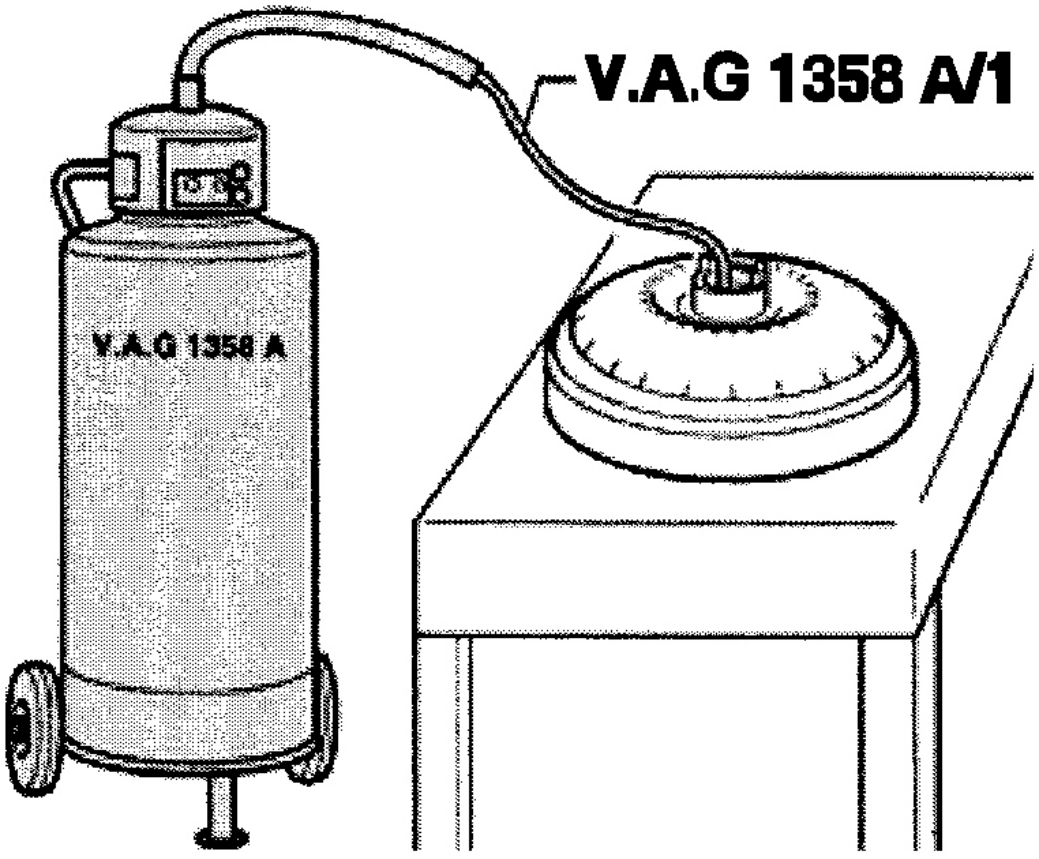

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Fig. 10: Draining Torque Converter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

TORQUE CONVERTER, REMOVING

Special Tools And Equipment

- VW 681 Extractor lever

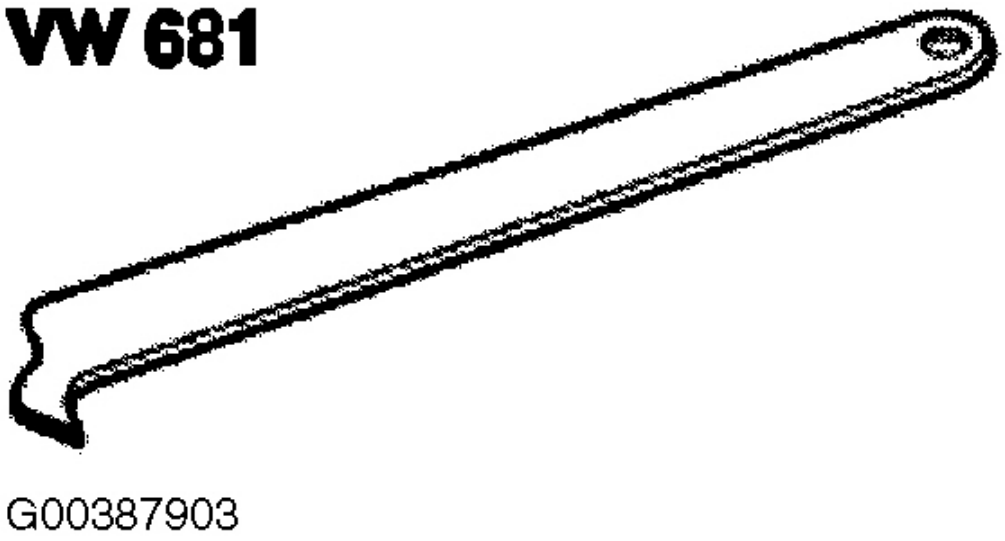

Fig. 11: Identifying Extractor Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Removing Torque Converter Oil Seal

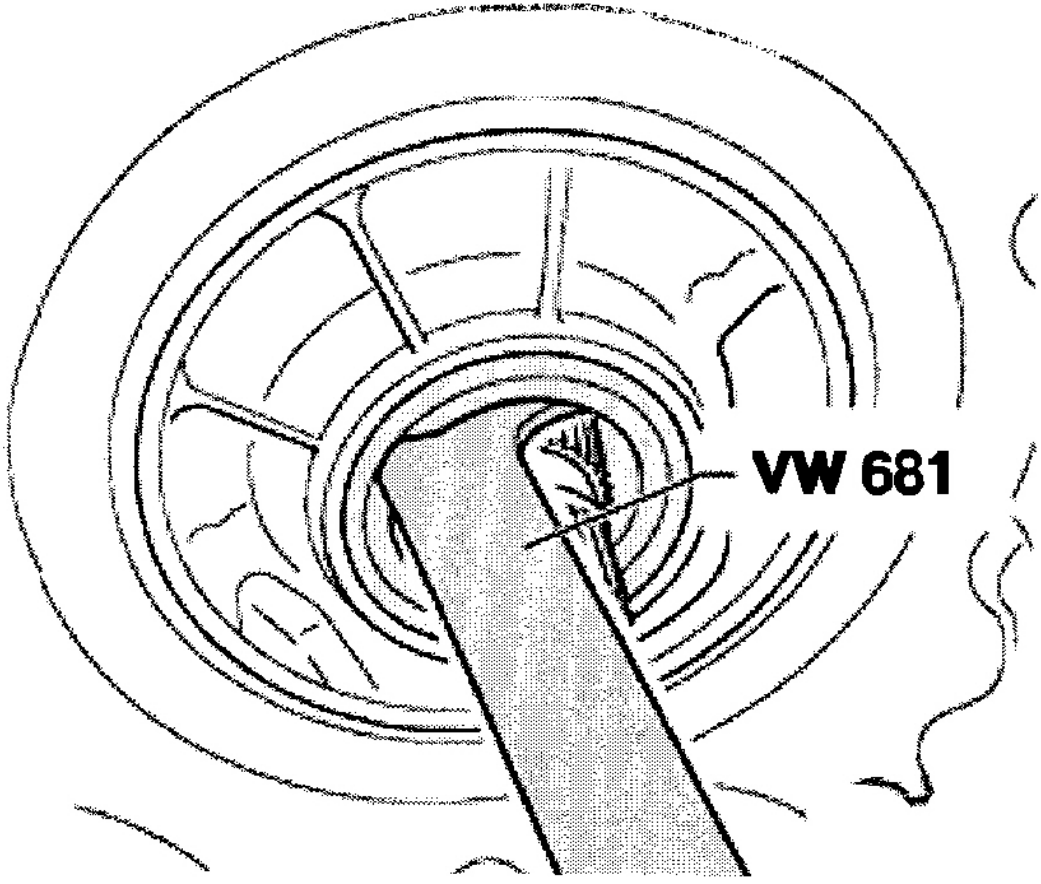

Fig. 12: Removing Torque Converter Oil Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

TORQUE CONVERTER, CHECKING

Check torque converter hub for scoring (arrow). See **Fig. 13** .

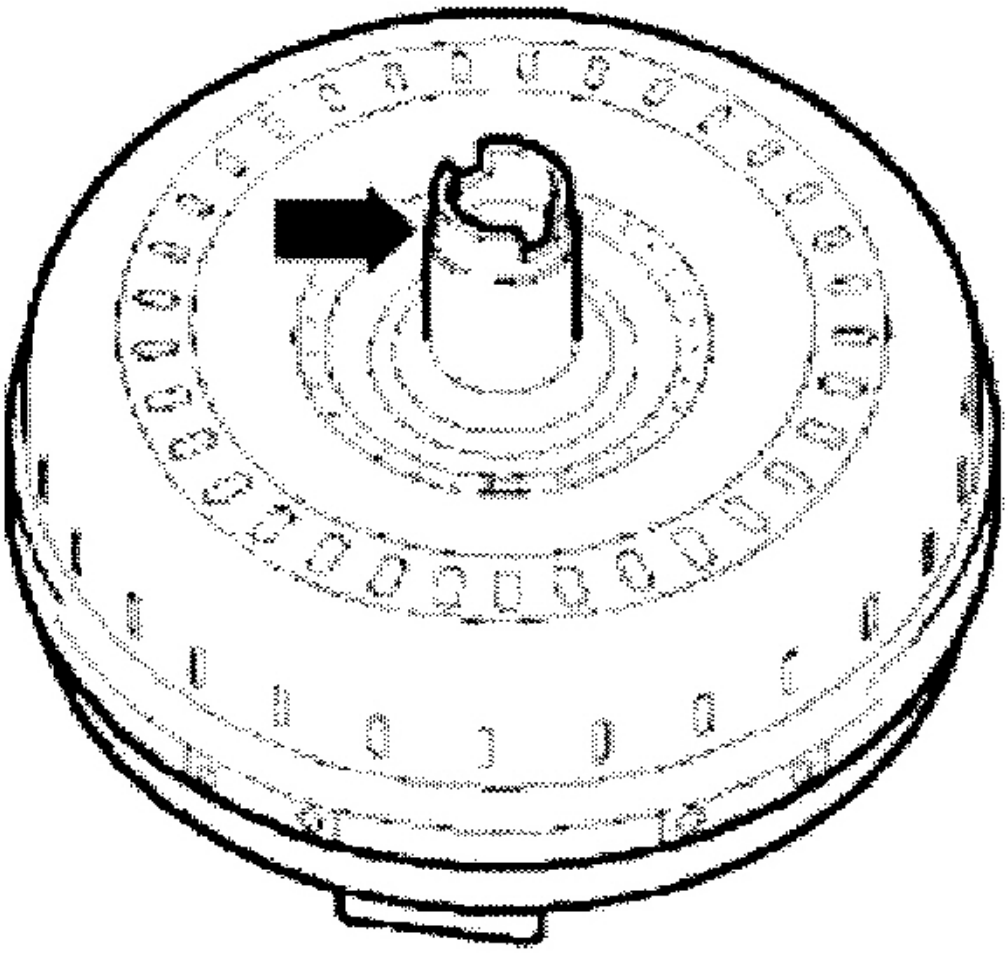

Fig. 13: Locating Torque Converter Hub
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Torque converter is worn and must be replaced if damaged.

TORQUE CONVERTER, INSTALLING

Special Tools And Equipment

- T10175 press piece
- Depth gauge

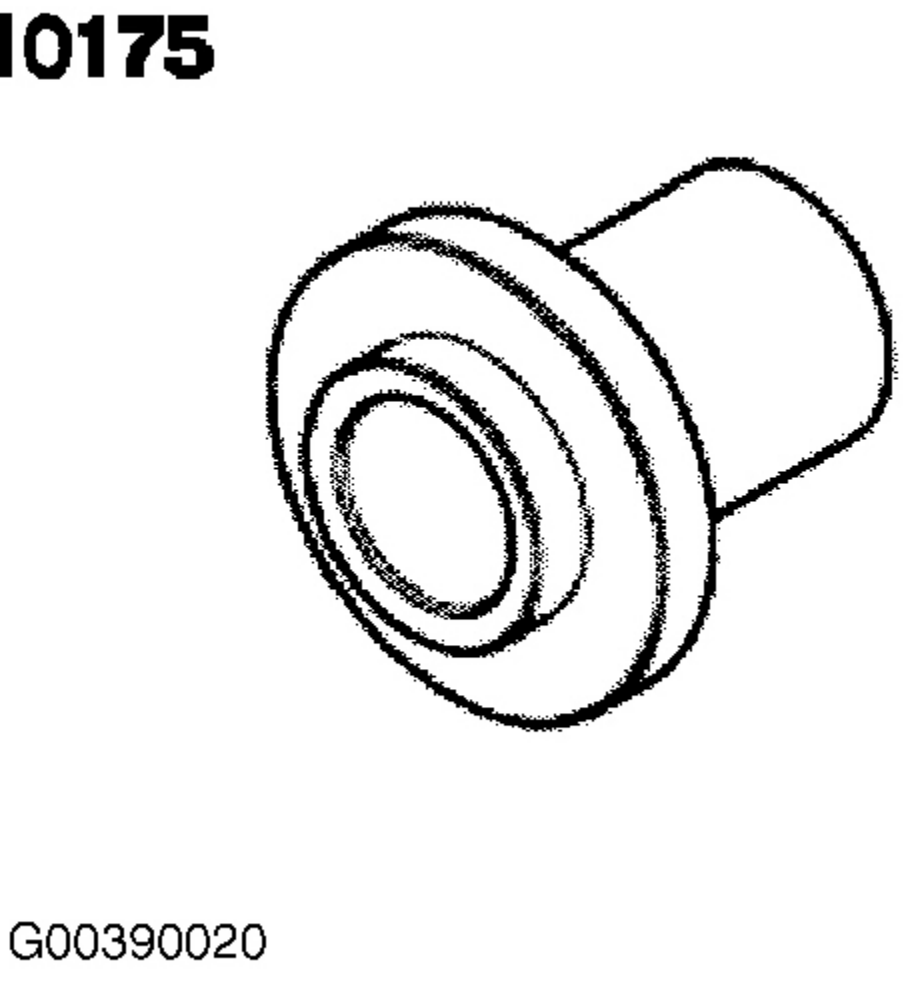

Fig. 14: Identifying Press Piece (T10175)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Driving In Torque Converter Oil Seal

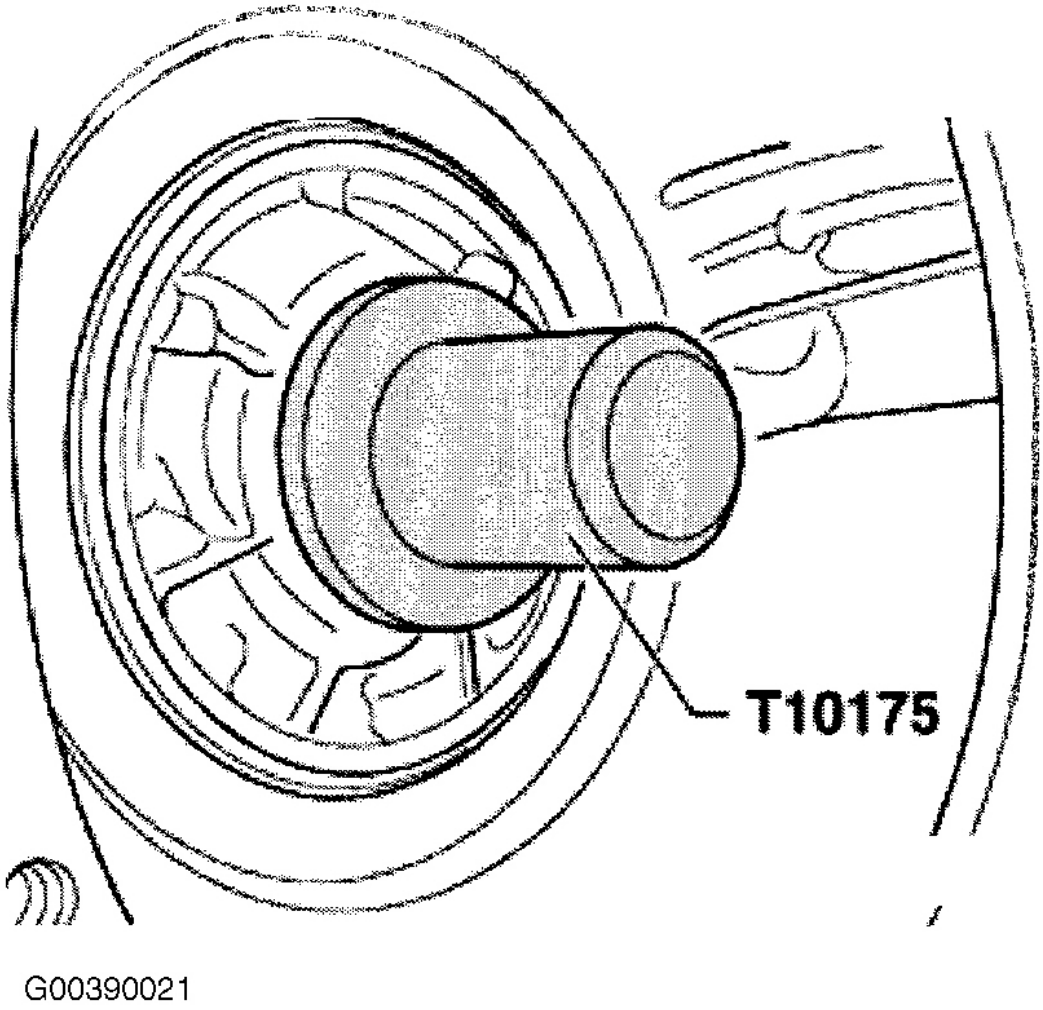

Fig. 15: Driving In Torque Converter Oil Seal Until Flush
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Slide torque converter hub through oil seal and onto first limit stop.

Turn torque converter while pushing in lightly until recesses in torque converter engage into drive of pump and torque converter slips noticeably inward.

Check Installation Dimension Of Torque Converter

When the torque converter is correctly installed in the transmission, the distance -a- between the contact surfaces down by the studs on the torque converter and the contact surfaces of the torque converter housing is approx. 20 mm. See **Fig. 16** .

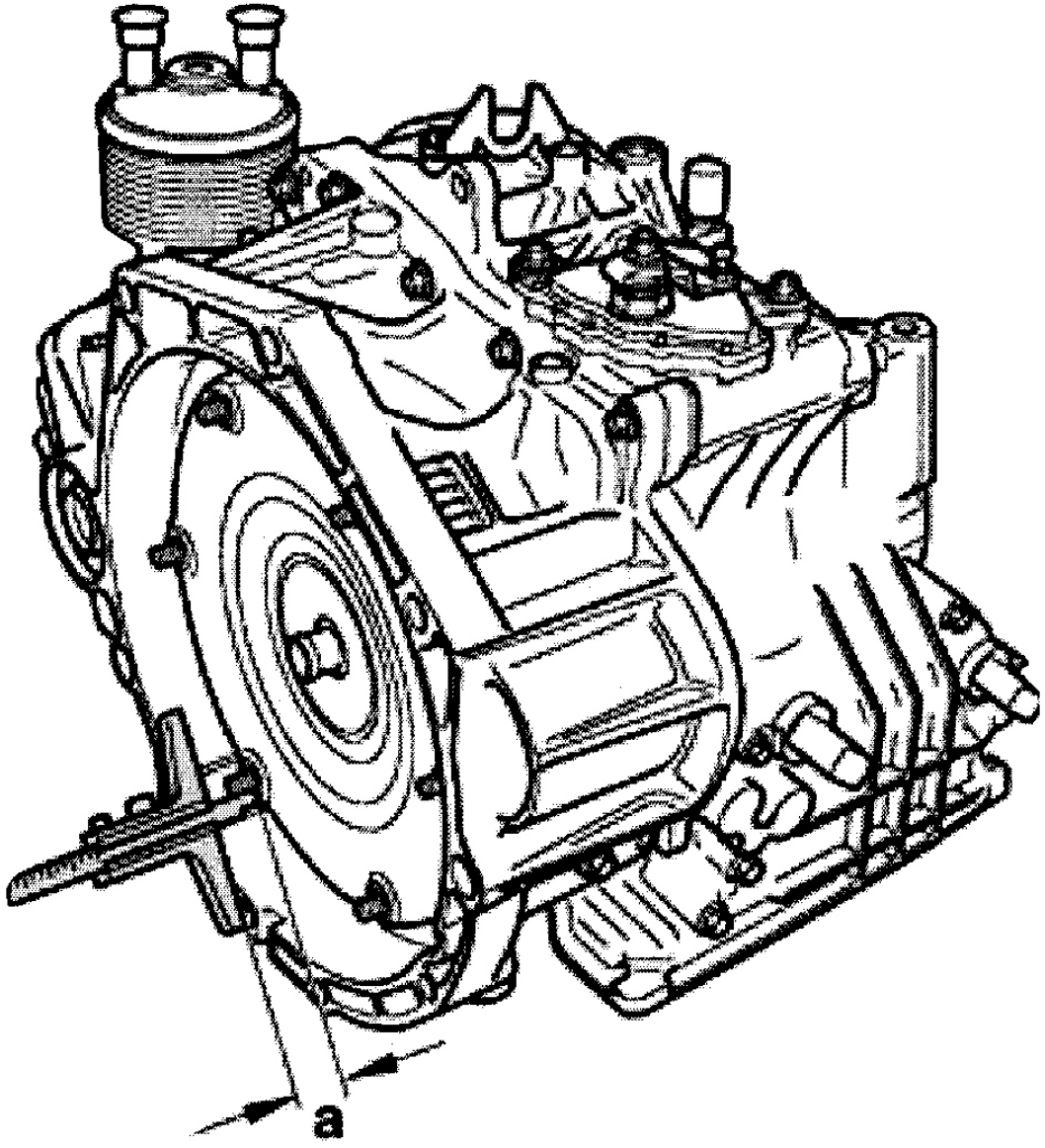

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Fig. 16: Checking Installation Dimension Of Torque Converter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

If the torque converter is incorrectly installed this distance is considerably less.

CAUTION: When the torque converter is incorrectly installed the torque converter

drive or the ATF pump will be destroyed when the transmission is connected to the engine.

When subsequently installing the transmission the following points must be observed:

When tightening the bolts on the engine/transmission flange, check often that the torque converter still moves behind the drive plate.

If the torque converter does not turn, one must assume that it has not been installed correctly and the torque converter drive or the ATF pump will be destroyed when finally tightening the bolts.

OVERHAUL

Manufacturer does not provide overhaul procedures or specifications. For fluid capacities and types, adjustment or servicing procedures, see **SERVICING - A/T (09G)** article. For removal and installation procedures, see **REMOVAL & INSTALLATION - A/T (09G)** article.